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The value of internal iliac artery ligation (IIAL) in a sample of Iraqi women with post-partum haemorrhage

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ABSTRACT

Severe pelvic bleeding is an anticipated life-threatening complication in the field of obstetrics and gynaecological surgical practice. One effective strategy is via ligation of the internal iliac artery (IIAL). The current study aimed at evaluating the success rate of IIAL in a sample of Iraqi women with postpartum haemorrhage. The present observational cohort study included 50 women with postpartum haemorrhage. Women aged from 35 to 45 years. The study was conducted at the gynaecology department, Al-Diwaniyah maternity and child teaching hospital, Al-Diwaniyah province, Iraq. The study started on January 2017 and ended in January 2018. An attempt of internal artery ligation was performed in all cases to control the bleeding, and the outcome was classified into one of three major groups. The first group in which control of bleeding was successful, the second group included women who ended up with hysterectomy and the third group included those unfortunate women that arrive late and died before bleeding was efficiently controlled. The mean age of women enrolled in the present study was 37.11 ±5.19 years. The study included 50 women with postpartum haemorrhage, 30 of them (60%) ended with preservation of uterus, 18 (36.0%) ended with hysterectomy, and 2 of them (4.0%) died because of late arrival and inability to control the severe bleeding with consequent shock, and death. Indications of IIAL were as following: atonic postpartum haemorrhage in 22 cases (44.0%), traumatic postpartum haemorrhage in 8 cases (16.0%) and placenta previa in 20 cases (40.0%). IIAL appears to be the rapid, safe and life-saving procedure to minimize mortality and morbidity in women suffering from postpartum bleeding; also, it plays a significant role to avoid unnecessary hysterectomy.



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INTRODUCTION

Severe pelvic bleeding is an anticipated life-threatening complication in the field of obstetrics and gynaecological surgical practice. The rate of morbidity and the degree of mortality following pelvic bleeding, that accompanies surgeries in association with postpartum haemorrhage and gynaecological operations, are relatively high and substantial and immediate medical effort is needed to control such bleeding to avoid such gloomy prognosis (Singh *et al.*, 2016). "Internal iliac artery ligation (IIAL)" is a fast, safe, and very efficient way of controlling bleeding from pelvic organs related to genital tract. When

taking the will of the woman who seeks preservation of her uterus to remain fertile and considering the anaesthetic and surgical risks in women who are already in shock state and circulatory compromise, this option of IIAL may be preferred over hysterectomy (Dohbit *et al.*, 2017). In addition, certain situations are characterized by inability to identify with certainty the source of bleeding for example in case of a vessel that is retracted inside the broad ligament following its tear or following massive hemorrhage postoperatively after vaginal or abdominal hysterectomy in which the point of bleeding is difficult to be detected (Tahmina *et al.*, 2017). Ligation of both internal iliac arteries decreases blood flow to pelvis to approximately half its original flow; also, it makes pulse pressure weak as it is reduced by a fraction of 85 percent and by this way it makes circulation sluggish and enhances hemostasis (Singh *et al.*, 2016). The presence of collateral circulation within the pelvis allows blood to flow in a retrograde fashion within the pelvic organs in a matter of seconds after internal iliac artery ligation and by this way; ischemia of pelvic organs is avoided. The success rate after IIAL is variable, and the reported figures are in the range of 42 to 100 percent, and it has been proved to make hysterectomy avoided in a significant proportion of patients (Joshi *et al.*, 2007; Vedantham *et al.*, 1997). The procedure of IIAL has the advantage of making a "bloodless operative field"; however, in certain centres, it has rarely been attempted because it is considered by many surgeons difficult procedure from the technical point of view. So hesitancy to perform the procedure and delayed decision to make IIAL are the main pitfalls associated with it despite being easy to learn an effective skill (Kalburgi *et al.*, 2012). Current knowledge about alterations in "spectral Doppler indices" of the ovarian and uterine arteries in women subjected to IIAL is somewhat little, and the effect of this procedure needs a lot of researches to make an alteration in these indices clear (Singh *et al.*, 2016). The rarity of reports about the process of IIAL in obstetrics practice in Iraq besides the substantial controversy in the available published articles about IIAL advantages and disadvantages justified the conductance of the present study. The current research aimed at evaluating the success rate of IIAL in a sample of Iraqi women with postpartum haemorrhage.

PATIENTS AND METHODS

The present observational cohort study included 50 women with postpartum haemorrhage — women aged from 35 to 45 years. The study was conducted at the gynaecology department, Al-Diwaniyah maternity and child teaching hospital, Al-Diwaniyah province, Iraq. The investigation

started on January 2017 and ended in January 2018. An attempt of internal artery ligation was performed in all cases to control the bleeding, and the outcome was classified into one of three major groups. The first group in which control of bleeding was successful, the second group included women who ended up with hysterectomy, and the third group included those unfortunate women that arrive late and died before bleeding was efficiently controlled.

Statistical analysis

Statistical analysis was carried out using statistical package for social sciences (SPSS) version 23. Numeric variables were expressed as mean and standard deviation while categorical variables were expressed as number and percentage. Student t-test was used to compare differences in mean values between control and study groups. Chi-square test was used to study the association between morbidity and mortality rate and time of presentation. The risk was estimated using the Odds Ratio.

RESULTS

The mean age of women enrolled in the present study was 37.11 ±5.19 years. The study included 50 women with postpartum haemorrhage, 30 of them (60%) ended with preservation of uterus, 18 (36.0%) finished with hysterectomy, and 2 of them (4.0%) died because of late arrival and the inability to control the severe bleeding with consequent shock and death, as shown in table 1. Indications of IIAL were as following: atonic postpartum haemorrhage in 22 cases (44.0%), traumatic postpartum haemorrhage in 8 cases (16.0%) and placenta previa in 20 cases (40.0%), as shown in table 2. The characteristics of women with atonic PPH are shown in table 3 in which it appears that women who are multiparous and old are more liable to develop atonic PPH than young women and nulliparous women. Traumatic PPH was due to either cervical tear or ruptured uterus, as shown in table 4. The indications of hysterectomy were: Ruptured uterus, Atonic PPH and Placenta previa in 6 (12.0%), 2 (4.0%) and 10 (20.0%) of cases, respectively, as shown in table 5. The early presentation within one hour or less resulted in a 97% reduction in the rate of mortality and morbidity, as shown in table 6.

Table 1: Total number of cases and the outcome

Characteristic	No. (%)
Total number	50 (100.0)
Preserved uterus	30 (60.0)
TAH	18 (36.0)
Dead	2 (4.0)

n: Number of cases.

Table 2: Indications of internal artery ligation

Indication	No.	%
Atonic PPH	22	44.0
Traumatic PPH	8	16.0
Placenta previa	20	40.0

Table 3: Characteristic of patients with atonic postpartum haemorrhage

Parity	No.	%
<3	3	6.0
3-5	9	18.0
>5	10	20.0
Age	No.	%
<20 y	1	2.0
21-30 y	4	8.0
31-40 y	7	14.0
>41 y	10	20.0

Table 4: Traumatic postpartum haemorrhage

Cause	No.	%
Cervical tear	4	8.0
Ruptured uterus	4	8.0

Table 6: Indications of hysterectomy

Indication	No.	%
Ruptured uterus	6	12.0
Atonic PPH	2	4.0
Placenta previa	10	20.0

Table 5: Traumatic postpartum haemorrhage

Outcome	Time		Total	P	OR	CI
	<1 hour	>1 hour				
Hysterectomy or death	5	15	20	<0.001**	0.07	(0.02-0.27)
Successful IIAL	25	5	30			
Meantime	0.83±0.03	2.34±0.56		<0.05*		

*Student t-test; ** Chi-square test

DISCUSSION

Ligation of both internal iliac arteries is an efficient way to control bleeding accompanying gynaecological and obstetric pelvic bleeding and may offer an alternative lifesaving method to avoid hysterectomy. The rate of efficiency of IIAL has ranged from 81 % up to 96.87% (Chelli *et al.*, 2010; Domingo *et al.*, 2013; Hussein *et al.*, 2018; Joshi *et al.*, 2007; Simsek *et al.*, 2012). In the present study, indications for IIAL included atonic postpartum haemorrhage, traumatic postpartum haemorrhage, and placenta previa. These indications are following indications described by Singh *et al.* (2016); however, rates of individual indications were different, for instance, the most common indication in our study was atonic postpartum haemorrhage whereas, the most frequent indication in Singh *et al.*, the study was placenta previa. We agree with most of the other studies in that the most frequent indication for IIAL was atonic postpartum haemorrhage (Camuzcuoglu *et al.*, 2010; Joshi *et al.*, 2007; Perveen *et al.*, 2011). When placenta previa is

complete, the blood supply to the lower placental segment is provided by descending cervical and vaginal arteries so that even if uterine artery is ligated, significant bleeding continues and here comes the role of IIAL that arrest blood flow to uterine, cervical and vaginal arteries (Joshi *et al.*, 2007). When there is a traumatic event to the uterus, the uterine artery may be retracted into the broad ligament, and the best way to stop significant life-threatening bleeding is by IIAL as an efficient substitute for hysterectomy. Also, the IIAL is playing an important role in the creation of bloodless field if hysterectomy is finally decided because, without such a procedure, blind clamping and ligating tissues submerged in a pool of blood are going to be avoided especially avoiding ureteric ligation. Some studies advice early and prophylactic IIAL in anticipation of severe pelvic bleeding as an obstetric complication (Kherro *et al.*, 2009; R. and M.P., 2014). The present study, adverse outcomes such as damage to the internal iliac vein, ureteric damage, accidental ligation of external iliac artery and necrosis of tissues supplied by internal iliac arteries were not reported; nevertheless, they have been recorded in the literature (Chelli *et al.*, 2010; Gao *et al.*, 2010; Joshi *et al.*, 2007). Following that trend, that IIAL is a safe procedure and not to be

associated with above mentioned adverse outcomes, several studies are in agreement (Kalburgi *et al.*, 2012; Mandal *et al.*, 2013; Perveen *et al.*, 2011). In our study, two women died due to the late presentation in which severe bleeding and shock were difficult to control. Death was recorded for the same reason by Singh *et al.* (2016). Other studies and causes recorded mortality due to postpartum haemorrhage included acute renal shutdown, DIC, pulmonary embolism, hepatic failure and sepsis (Joshi *et al.*, 2007; Perveen *et al.*, 2011; Singh *et al.*, 2016). The most important determinant factor for mortality is the time lag between haemorrhage and medical intervention, the early the time, the less are the mortality and morbidity rates associated with obstetric haemorrhage (Joshi *et al.*, 2007; Kalburgi *et al.*, 2012; Montgomery *et al.*, 2014; Singh *et al.*, 2016).

CONCLUSION

In conclusion, IIAL appears to be the rapid, safe and life-saving procedure to minimize mortality and morbidity in women suffering from postpartum

bleeding. Also, it plays a significant role to avoid unnecessary hysterectomy.

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